GUJARAT TECHNOLOGICAL UNIVERSITY

BE-4 SEMESTER – NEW SYLLABUS –(NUMERICAL VIDEO Lectures)

Subject Name & Code:
Operation Research (BE04000201)

Unit 1: Linear Programming Problem (LPP)

Sr.	Numerical Topic	Video Link-1	Video Link-2
			https://youtu.be/3rdpmYavMDs?si=jNPVeJL5mzS5b20f
1	LPP Formulation from word problem	https://youtu.be/fgoaGxzwLqI?si=uRRj3jux2qUo6Cf-	
		https://youtu.be/qHwtctVrZ5o?si=8j_nKAEoqoKn9Ipi	
		https://youtu.be/KABS6d-d_wg?si=KweFYNwRaas_Gpuu	
2	Graphical solution (Maximization & Minimization)	https://youtu.be/ku1KSgBfzs4?si=2fmr-lOpyzzoOx8f	https://youtu.be/2EvC1v1Fl2k?si=l1mVXxkUkRAxV--w
3	Simplex Method (Maximization case)	https://youtu.be/Y2T3MMvaEPU?si=Kn85hut5-wIsj12F	https://youtu.be/01Iy2ZHOmNg?si=5Q0VEAYczUByKoOz
		https://youtu.be/0PAOSZhwsnc?si=9NnITi-N4ueUQPQu	https://youtu.be/5fHOaujhbP0?si=Y0kTUCQWSNVAgJD3
4	Simplex Method (Minimization case)	https://youtu.be/0cZKvD05i9U?si=7EoZ2IkaiLh3tcVj	
5	Big M Method (Penalty method)	https://youtu.be/W_6ACHrjuWM?si=IjSzDR3EgR_1Wtim	https://youtu.be/dLSNqfeLbnA?si=TON4BjjQSZIkVM4G
		https://youtu.be/hnK5iDddDAg?si=h4ldxfNEsphBs-_y	
8	Primal to Dual conversion	https://youtu.be/SN67lGlID7M?si=wIPHvz7d0oWv7tWv	https://youtu.be/vFQv4hMdoNM?si=8T4yFrYqronX_YZZ
		https://youtu.be/16ecu-Ks3I4?si=3GcbSp59oPPCt3T4	

Unit 2: Transportation & Assignment

Sr.	Numerical Topic	Video Link-1	Video Link-2
10	NW Corner Rule (Initial basic feasible solution)	https://youtu.be/tvNNKorAWog?si=z5sTXIkk069wECGY	https://youtu.be/GE52LzWhzsM?si=Zc8-5jYoirhPbvp7
11	Least Cost Method (Matrix Minima)	https://youtu.be/wuYVUZWJre8?si=_aloC4xzUq4IDCiS	https://youtu.be/i2jBC6qUPww?si=0jJf20xSQ6G9lYlR
		https://youtu.be/9PsitTmD3qE?si=BlY8ATtHL-1PF4cI	
12	Vogel's Approximation Method (VAM)	https://youtu.be/kiDZjlSSlFw?si=1Y17EI2li0KA8hdv	https://youtu.be/yT6-JePScWA?si=SJV5-qP2rmKypP9u
		https://youtu.be/a_Hka6oROC4?si=-0uLwoyZYfJF3_zc	
13	Degeneracy in Transportation	https://youtu.be/Bt9IG9TTXZI?si=fe3T-r3Zh0jwDoyd	https://youtu.be/oTqepRyrzzY?si=jeSXykq5ToRVQI-0
14	MODI Method (U-V method) for optimal solution	https://youtu.be/DpkswrRekBQ?si=dSm-VyjaEXRHC4Mz	https://youtu.be/JgslbQW1Fv4?si=GCuyuXsBHxhtCxtU
		https://youtu.be/NqXFWCHIbII?si=zu51RgOHJkWIFwzr	
15	Unbalanced Transportation Problem	https://youtu.be/zhlkLiqvrhI?si=t8hk98q2Tr3TdgtB	https://youtu.be/c9TQQByYnHs?si=PZ45CjyDrQJMxBi7
16	Profit maximization Transportation	https://youtu.be/9iGEMmWkthA?si=6d0xWduPmt1EHbi7	https://youtu.be/LeWilu5EG_8?si=VwsrT-jt2tXZTGTF
17	Transshipment Problem	https://youtu.be/PunyzXHVo14?si=bQ5sS9ikJCQ1Brf6	
18	Assignment Problem (Hungarian Method)	https://youtu.be/I3CNzKUFINY?si=nLMsX7yf2r41OanR	https://youtu.be/-M-CUgZcRhw?si=usx1IOARCuBXVIa5
		https://youtu.be/BWDe02Di0EY?si=qJcGIkxORJBGlASK	
		https://youtu.be/F9IyxkjoHm4?si=DLFjIO-CcFgnm7vp	https://youtu.be/EJPzDxLR550?si=1CDXYBuzXli8QqJi
19	Travelling Salesman Problem (TSP)	https://youtu.be/VIt56P5-g1U?si=DwaG0qOIFRcWc5Em	https://youtu.be/IiDLxxT0Q9Y?si=1RqO-eQ2rszuwai2

Unit 3: Queuing Theory			
Sr.	Numerical Topic	Video Link-1	Video Link-2
20	M/M/1 Queue model (∞/FCFS) – find Ls, Lq, Ws, Wq	https://youtu.be/xlenI95G0eI?si=lTVQCJHsc34XlKvj	
		https://youtu.be/1vzqyzS7Z64?si=Ak_H_drg6pYVW4ud	
		https://youtu.be/sX2DeU6UQ4A?si=unnEEcPuYv7puJJv	
		https://youtu.be/9gqc91Ivrek?si=iBFzV0IJiLCWXS7j	
		https://youtu.be/Sg7eJEueZDo?si=-bnkE5DdAIvaCM1B	
21	Probability of n customers in system	https://youtu.be/Mhg_qcPN7dQ?si=xUCYCklqgqPGeAxW	
		https://youtu.be/Dyn1J1_1uGM?si=cLYweLKe1BDFXsRM	
		https://youtu.be/EpyFT6hdOkM?si=1inThndWyR0W5OUi	
Unit 4: Inventory Control			
Sr.	Numerical Topic	Video Link-1	Video Link-2
22	EOQ model with no shortages	https://youtu.be/WPp2qibomPo?si=gdEJrQXv_edGhfDy	
		https://youtu.be/_-WUqBzKfkI?si=obUE5FTOYLb6JmNL	
23	EOQ with lead time & reorder point	https://youtube.com/shorts/QEzOXnchbuA?si=79p6n9d3WpU3x6Pp	
24	EOQ with quantity discounts	https://youtu.be/d8WwNpvAp3M?si=qKY6aAgLuqgTM7b1	
25	ABC analysis (numerical classification)	https://youtu.be/UkI9ybTfzkI?si=v2H-aX8IZIE1n3h2	
		https://youtu.be/Rs9mJIQ4RiA?si=UQkOyNe1Pg8pQf_o	

Unit 5: Replacement Theory			
Sr.	Numerical Topic	Video Link-1	Video Link-2
26	Replacement of equipment depreciating with time	https://youtu.be/HsS5stCBMa0?si=0jTCGsZVMXjL38Io	
		https://youtu.be/lyStZmwZYBM?si=k6oHNhFVtE-dnIML	
		https://youtu.be/l25K4FzGy_E?si=hVKoeoZu7x-DHYhL	
		https://youtu.be/llDMxu8TAyM?si=JyLK4hOFnU_VjQGz	
27	Group replacement vs individual replacement	https://youtu.be/2X8K8HNbZbI?si=ftwyOQjBzT6lC-c3	
Unit 6: Game Theory			
Sr.	Numerical Topic	Video Link-1	Video Link-2
28	Pure strategy (Saddle point)	https://youtu.be/PzY71ZNHfdQ?si=IUP41bFodu3NrKm9	https://youtu.be/En1B2WhrLCM?si=pAu8vVC9VTkkpoI-
29	Dominance method	https://youtu.be/ySUka6wvhQo?si=YQnr0xPj85u1N0V_	https://youtu.be/63NkkNwd9GI?si=991qxcEQ4uGqqWDy
		https://youtu.be/YHeuMg6ugjE?si=tHZLP0th86E49BeR	
30	2×2 Mixed strategy (Arithmetic method)	https://youtu.be/lm_VuwavA_Y?si=7GhPi3-oEfPqixbu	
31	m×2 Mixed strategy (Graphical method)	https://youtu.be/wG-dm40Zn9s?si=r7NUWk3dm6PN5ksr	
		https://youtu.be/miavR8SMW_Y?si=6SaN_uVKxJJ0uDtO	
32	Algebraic method for mixed strategy		

Unit 7: Decision Theory			
Sr.	Numerical Topic	Video Link-1	Video Link-2
		https://youtu.be/8S6LOBddb-o?si=sPizx5f1L7kxjX8O	https://youtu.be/a_tcLbJB1U4?si=N25EaM8SDjugWlCq
33	Decision under certainty		https://youtu.be/iMcpwaH1DKQ?si=oeH_7JwLMPw7FF_3
34	Decision under risk (EMV)		
35	Maximin / Minimax criteria		https://youtu.be/Wl-U-1Kw97M?si=NV6H6o2rJlYVTU34
36	Savage Minimax Regret criterion		
37	Hurwicz criterion (realism)		
38	Laplace criterion (equal probability)		
39	Decision Tree numerical		https://youtu.be/3E0rTKp-4kA?si=p-vxJz3rUguHvlxZ
Unit 8: Project Management (PERT / CPM)			
Sr.	Numerical Topic	Video Link-1	Video Link-2
40	Drawing CPM network from activity list		https://youtu.be/vUMGvpsb8dc?si=IYq0Ga0xxBj2PeLo
41	Critical Path calculation (Forward & Backward pass)	https://youtu.be/zF6B5oWSIFY?si=RKvqI8js0DKO9YFa	
		https://youtu.be/kj-CxhG7XBw?si=a9suiilgeBM5sKEs	
42	Total Float, Free Float, Independent Float		
43	PERT – Expected time & variance		https://youtu.be/WrAf6zdteXI?si=jbAdQrX-NqBW11Qa
44	Probability of completing project by deadline		
45	Crashing of network (Cost-time trade-off)		https://youtu.be/U7kXfNnAjcE?si=e-QUxAJsxtiTmeP5
			https://youtu.be/B2zQUx32C84?si=j4yXCOEOKN_kX7JI
			https://youtu.be/m8P367jmIzc?si=oOfRPD11rSZ8eoeB
			https://youtu.be/8FDyWi27xDM?si=dv4lkG81jtQ9eAyS